



HPS1000

High-Current Powered Subwoofer

Technical Manual



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H A Harman International Company

Rev. A 8/00

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CAUTIONS AND WARNINGS

BEFORE THIS AMPLIFIER IS PLUGGED IN, make sure its rated voltage corresponds to the voltage of the AC power source to be employed. Failure to use the correct voltage could cause damage to the amplifier when the AC power cable is plugged in. Do not exceed the rated voltage by more than 10%; operation below 90% will degrade performance or cause the unit to shut off.

WHEN SERVICING THIS AMPLIFIER:

1. Do not touch the metal frame of the woofer (if removed from the cabinet) when driving the amplifier at high power levels. In the unlikely event that the output devices in the amplifier fail and present an open circuit during their operation, AND the driver voice coil was to come in contact with the motor assembly, hazardous voltage could be present at the woofer frame.

2. When 120/230v-based test equipment is connected to the amplifier in any way, use of a 1000W isolation transformer (Stancor model GIS-1000 or similar) on the subwoofer is necessary for safety; in addition, an isolator plug, (a three-to-one pin adapter sometimes called a "cheater plug") should be used on the power cord plug of the test equipment being used.

GENERAL SPECIFICATIONS

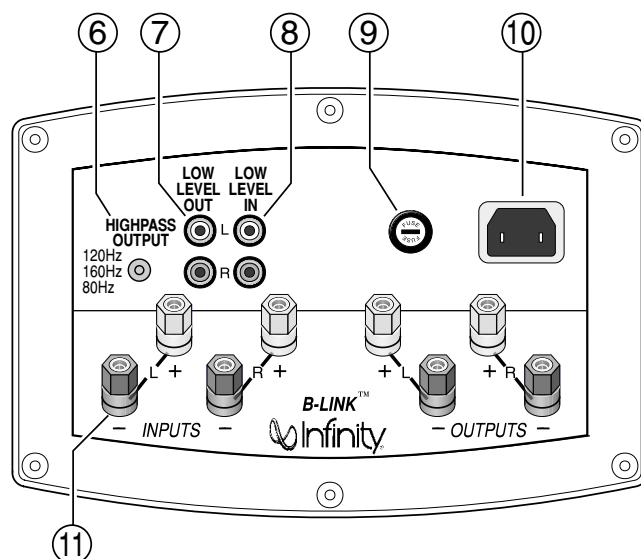
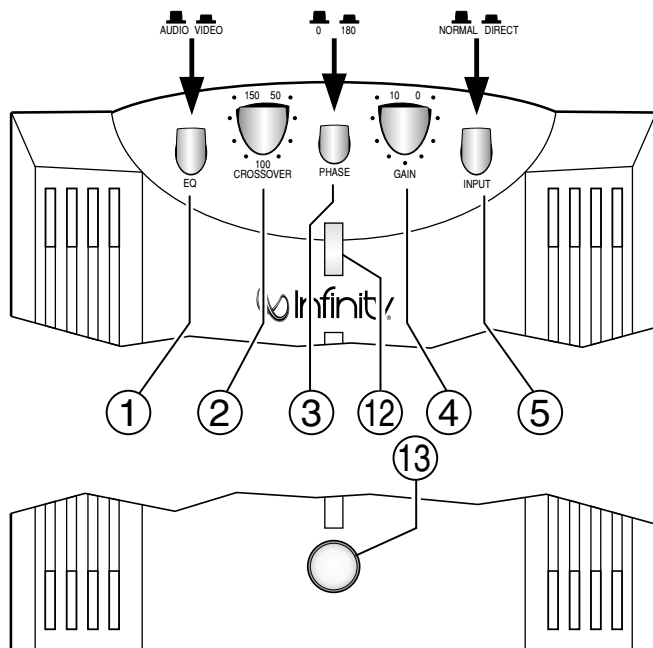
Frequency Response ($\pm 3\text{dB}$).....	18 ~ 150Hz
Output	1000 Watts
Driver	15" Downfiring Woofer and two 15" Passive Radiators
Dimensions (H x W x D)	21-7/8" x 20-7/16" x 23-13/16" 556mm x 519mm x 605mm
Weight.....	96 lbs., 43.5kg.
Refinements may be made on occasion to existing products without notice, but will always meet or exceed original specifications unless otherwise stated.	

HPS1000 SPECIFICATIONS

Frequency response	18Hz - 150Hz	
Drive unit	15" Woofer	(2) 15" Passive Radiators
Weight	96lbs/43.5kg	
Dimensions	21 7/8 x 20 7/16 x 23 13/16" (556 x 519 x 605mm)	

LINE VOLTAGE					
US 120vac/60Hz					
EU 230vac/50-60Hz					
Parameter	Specification	Unit	Limits	Conditions	Notes
Amp Section					
Type (Class AB, D, other)	AB Bridged	--	--	BASH® Power Supply	
Load Impedance (speaker)	7	Ohms	--	Nominal	Z-curve required
Rated Output Power	1000	Watts	900	1 input driven	
THD @ Rated Power	0.8	%	1	22k filter	500w
THD @ 1 Watt	0.5	%	1	22k filter	
Polarity	0	deg.	0 ±20	In phase at 50Hz in Direct Mode	.250 faston (+).....205 faston (-)
DC Offset	20	mV-DC	50	@ Speaker Outputs	
Damping factor	>200	DF	--	@ 700w/27Hz	
Input Sensitivity					
Input Frequency	27	Hz	27	Nominal Freq.	1 input driven
Line Input	350	mVrms	±2dB	800w ref.	1 input driven
Speaker/Hi Level Input	7.4	Vrms	±2dB	800w ref.	1 input driven
Signal to Noise					
SNR-A-Weighted	100	dBA	90	relative to rated power	A-Weighting filter
SNR-unweighted	70	dBr	70	relative to rated power	22k filter
SNR rel. 1W-unweighted	60	dBr	55	relative to 1W Output	22k filter
Residual Noise Floor	2	mVrms	3	Volume @max, using RMS reading	DMM/VOM (or A/P)
Residual Noise Floor	1.5	mVrms(max)	2	Volume @max, w/ A/P Swept Bandpass Measurement (Line freq.+ harmonics)	
Input Impedance Line Input	3k	ohms	N/A		
Speaker/Hi Level Input	470	ohms	N/A		
Active Filters					
Low Pass (fixed or variable)	Variable			Note: Center position = 100Hz	
Low Pass filter (point or range)	45-120	Hz	±2dB		
Slope	12	dB/Octave	n/a		
Q	--	Damping	n/a		
Normal-Direct Switch	yes	--	functional		
Low Pass filter (point or range)	160 (direct) 45-120 (normal)	Hz	±2dB		
Slope	12	dB/Octave	--		
Q	--	Damping	--		
Subsonic filter (HPF)	27	Hz	±2dB		
Slope	12	dB/Octave	--		
Q	--	Damping	--		
Video Boost Switch	yes	--	--		
Boost	+3	dB	±1dB		
Range	40-80	Hz	--		
Limiter	yes				
Features					
Phase Switch (yes/no)	yes	--	functional		
Line Output (80Hz HPF-unity gain)	yes	--	functional		
Volume pot Taper (lin/log)	log	--	functional		
Input Configuration					
Line In (L,C,R,AC3,Mono)	L,R	--	functional		
Spkr/Hi Level In (L,C,R,mono)	L,R	--	functional		
Line Outputs (L,C,R)	L,R	--	functional		Z-out=10k: Use 100k load for testing
Line Out Crossover Switch	yes				
Line Out: 80/120/160Hz HPF	80/120/160	Hz	functional		
Slope	6	dB/Octave	functional		
Q	0.707	Damping	functional		
Hi Level Out	yes	--	functional		Loop through for L,R Hi Level Inputs
Power on Delay time	>3	sec.	>3	AC Power Applied	
Transients/Pops					
ATO Transient	10	mV-peak	20	@ Speaker Outputs	
Turn-on Transient	500	mV-peak	1v-pp	@ Speaker Outputs	AC Line cycled from OFF to ON
Turn-off Transient	500	mV-peak	1v-pp	@ Speaker Outputs	AC Line cycled from ON to OFF
Efficiency					
Stand-by Input Power	10	Watts	15	@ nom. line voltage	
Efficiency	#REF!	%	70	@ nom. line voltage	800w ref..
Protection					
Thermal Protection	yes		functional		Decreases gain at 113 C -1.3dB
DC Offset Protection	yes		functional	DC present at Speaker Out leads	Relay or crowbar (for driver/fire protection)
Line Fuse Rating	6	Amps	functional	Type-T or Slo Blo	

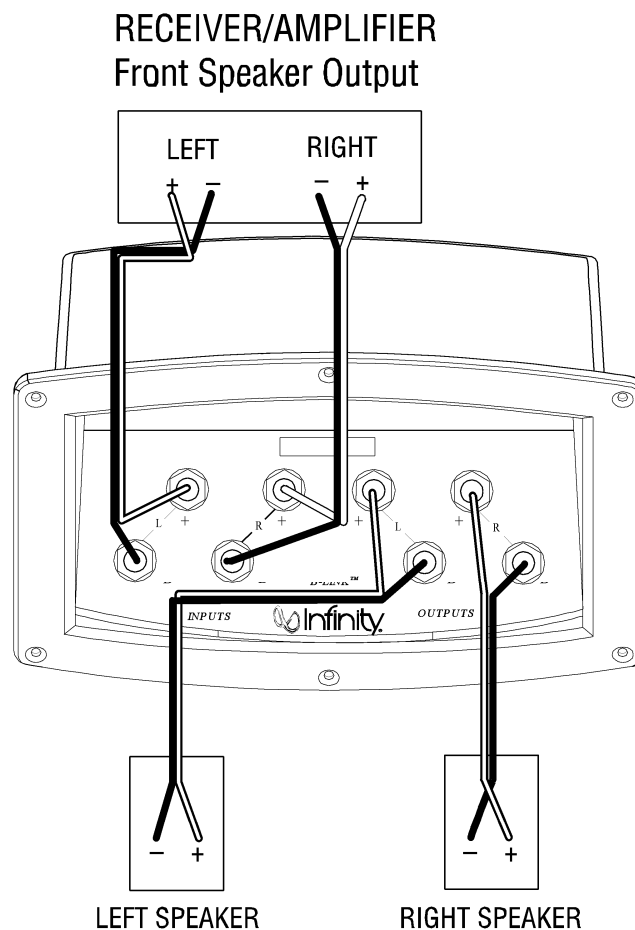
CONTROLS AND CONNECTIONS



- 1. Equalizer** - The EQ optimizes subwoofer performance for audio or video playback.
- 2. Crossover Frequency** - The crossover frequency knob determines the highest frequency your subwoofer will reproduce. It allows a seamless transition from the subwoofer to the satellite speakers.
- 3. Phase** - The phase switch is used to adjust the relative polarity of the subwoofer. When the phase switch is up, the phase is normal - when the switch is depressed, the subwoofer is 180 degrees out of phase.
- 4. Gain** - This knob controls the volume status of the subwoofer.
- 5. Input** - The Input switches between the normal line/speaker inputs and the direct-LFE input.
- 6. Highpass Output** - This toggle switch controls the roll-off frequency of the high pass filter, the LOW LEVEL OUT connectors, #7.
- 7. Low Level output** - These RCA output jacks are used when it is desirable to limit the low frequencies to your main receiver/power amplifier; see more on page 6
- 8. Low Level Input** - Main RCA input jacks, recommend hook-up method. When using a single LFE (Low Frequency Effects) cable from a Dolby Digital receiver/processor, use either left or right RCA jack.
- 9. Fuse** - Use only same type of fuses. Use a 6A 250v MDL Slo-Blo fuse for the 120v model, and a 3A 250v MDL Slo-Blo fuse for the 230v model.
- 10. AC Plug** - Plug in the AC line cord in here.
- 11. High Level Inputs** - These High Level Inputs are for receivers that do not have line-level "pre-amp out" or "subwoofer out" jacks. When a pair of main or satellite speakers are attached to the OUTPUT terminals, they are driven the full range of frequencies as generated by the music source (receiver, amplifier, etc.)
- 12. LED** - This LED turns green when the HPS250 is receiving power (is turned on) and is receiving a signal.
- 13. Main** - This button is the master power switch.

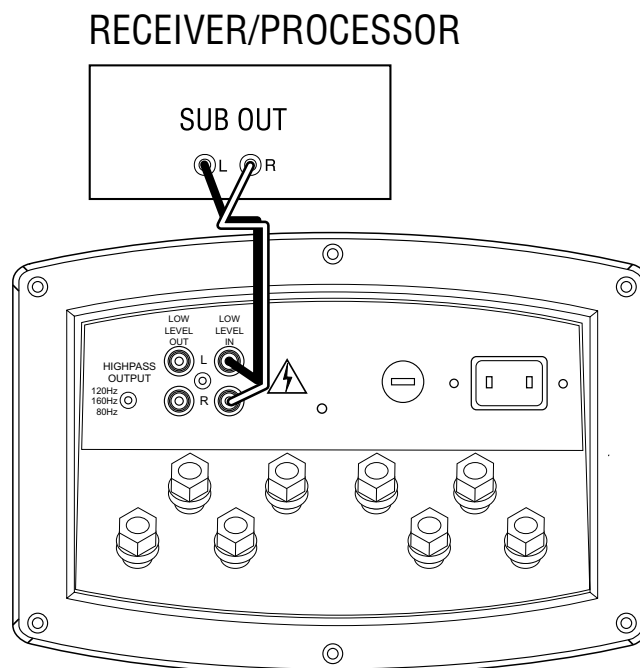
HPS1000 CONNECTIONS

If your receiver/processor does not have subwoofer outputs for the left and right channels:



If your receiver/processor has subwoofer outputs for the left and right channels:

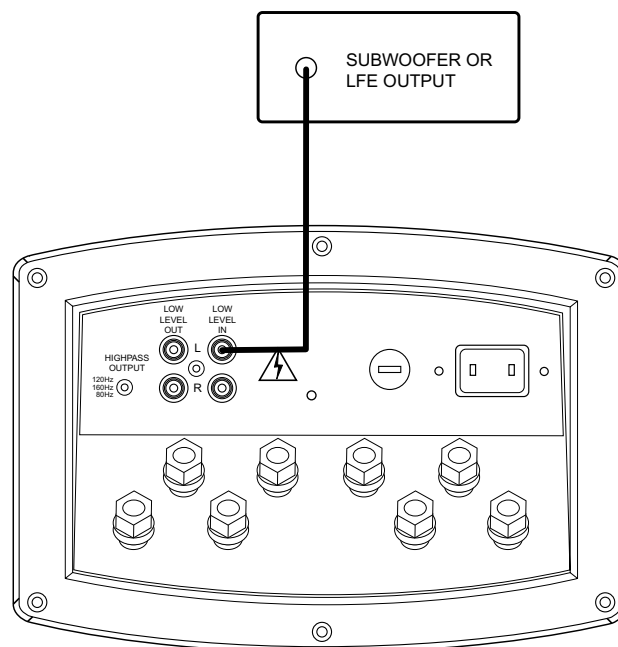
NOTE: Some receivers have a single subwoofer output (do not confuse this with a single LFE output as described on the next page). In that case, it is recommended that you use a Y connector (not included) to maximize performance.



HPS1000 CONNECTIONS Continued...

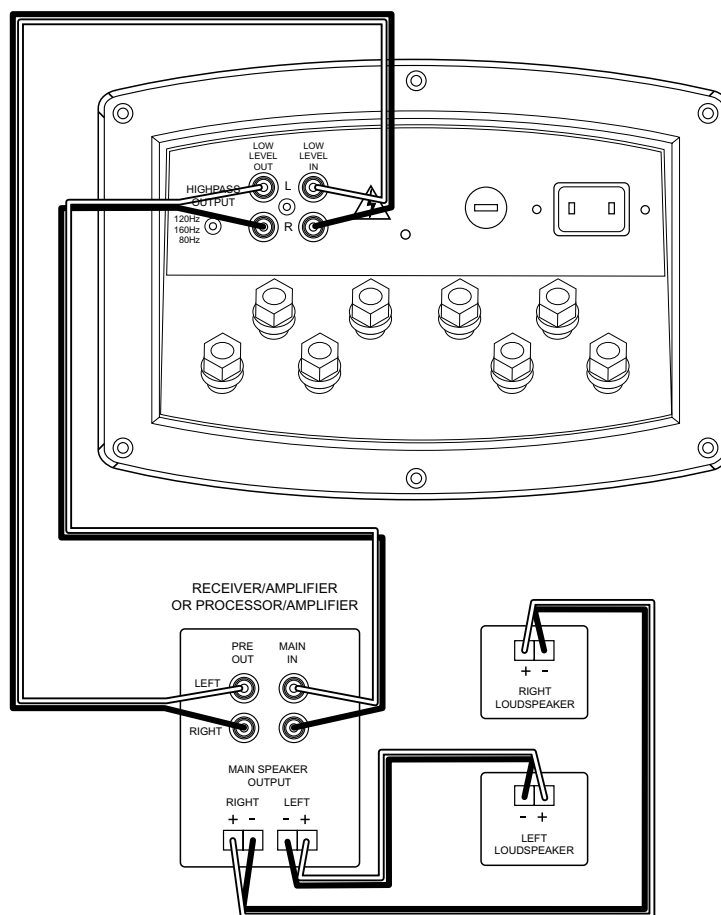
If you have a Dolby Digital or DTS® receiver/processor with a low-frequency-effect (LFE) output:

NOTE: In this case, you do not need to use a Y connector. Simply connect the LFE output on your receiver/processor to either the left or right input on the subwoofer:



If your receiver/amplifier has preamp output jacks and main input jacks for the left and right channels or you have a separate preamp/processor and power amplifier:

This method of hookup can offer the highest level of performance for your complete loudspeaker system. Your subwoofer incorporates an adjustable high-pass crossover in addition to a variable low-pass crossover. When hooked up as shown on the right, the subwoofer will limit the low-frequency information that is returned to your receiver/amplifier. Your receiver/amplifier does not need to waste valuable power reproducing the low frequencies. In addition, since no low-frequency information is being sent to your main loudspeakers, they are able to reproduce mid and high frequencies with greater clarity.



OPERATION

Setting the Controls

1. Initially set the HPS1000's Gain control to the "O" position.
2. Initially set the HPS1000's Crossover control to the 100Hz position.

Turning the Power On

3. Plug your HPS1000's AC cord into a wall outlet. Do not use the outlets on the back of the receiver.
4. Turn on your HPS1000 sub by pressing the power button on the center of the front panel.
5. Turn on your entire audio system and start a CD or movie sound track at a moderate level.

Adjusting the Gain Control

6. Turn your HPS1000's Gain control (page 4, #4) up to the "5" position (half way). If no sound emanates from the subwoofer, check the AC-line cord and input cables. Are the connectors on the cables making proper contact? Is the AC plug connected to a "live" receptacle? Has the power button been pressed to the "on" position? (Note: A green indicator on the front panel will light when the power is on.) Once you have confirmed that the subwoofer is active, proceed by playing a CD, record or cassette. Use a selection that has ample bass information.
7. Set the overall volume control of the preamplifier or stereo to a comfortable level. Adjust the subwoofer's Gain control (page 4, #4) until you obtain a pleasing blend of bass. Bass response should not overpower the room but rather be adjusted so there is a harmonious blend across the entire musical range. Many users have a tendency to set the subwoofer volume too loud, adhering to the belief that a subwoofer is there to produce lots of bass. This is not entirely true. A subwoofer is there to enhance bass, extending the response of the entire system so the bass can be felt as well as heard. However, overall balance must be maintained or the music will not sound natural. An experienced listener will set the volume of the subwoofer so its impact on bass response is always there but never obtrusive.

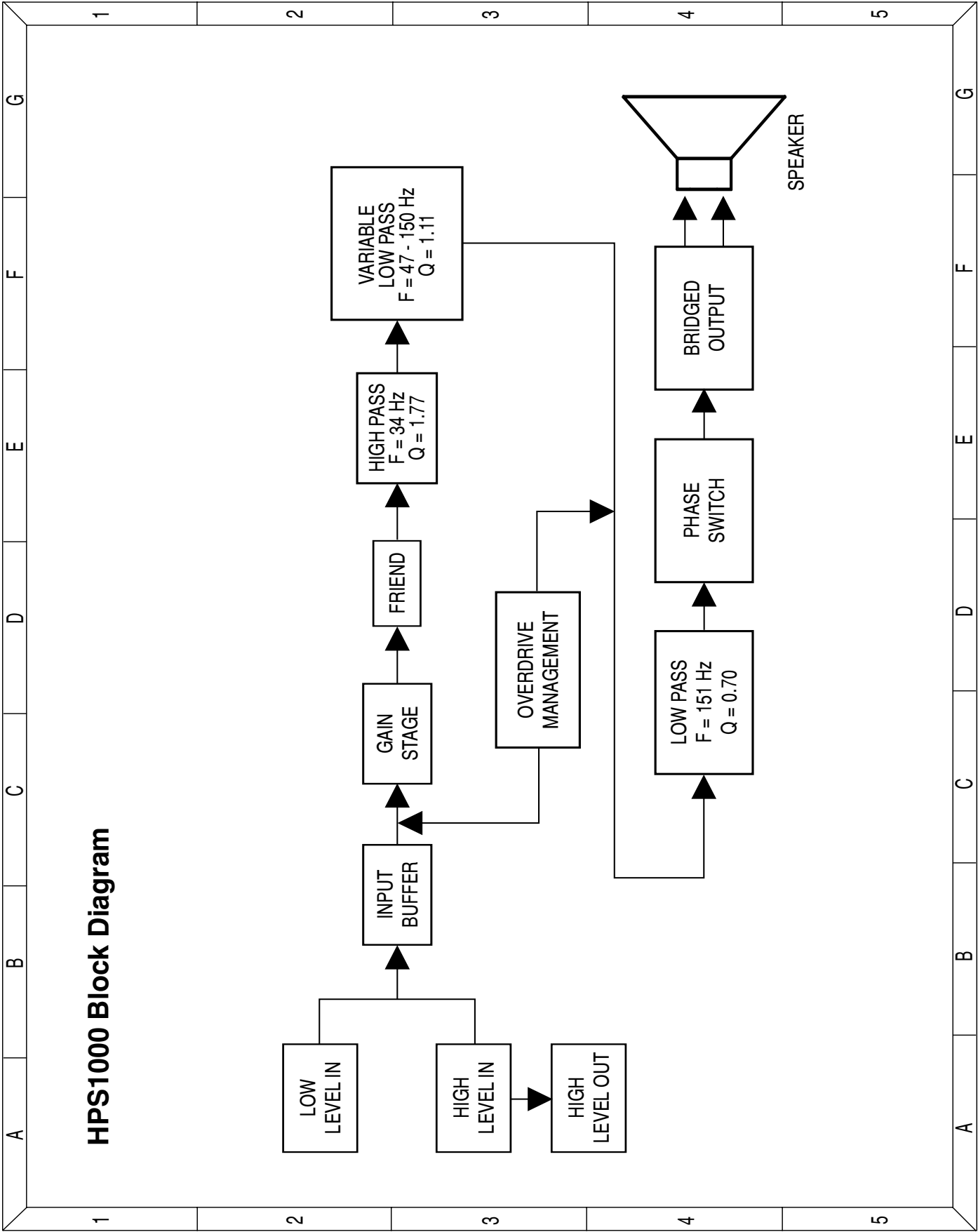
Crossover Adjustments

8. Crossover Control (page 4, #2) – The Low-Pass control determines the highest frequency at which the subwoofer reproduces sounds. If your main speakers can comfortably reproduce some low-frequency sounds, set this control to a lower frequency setting, between 50Hz – 100Hz. This will concentrate the subwoofer's efforts on the ultradeep bass sounds required by today's films and music. If you are using smaller bookshelf speakers that do not extend to the lower bass frequencies, set the low-pass crossover control to a higher setting, between 120Hz – 150Hz.

The Phase Control

9. The Phase Control (page 4, #3) determines whether the subwoofer speaker's piston-like action moves in and out with the main speakers, 0°, or opposite the main speakers, 180°. Proper phase adjustment depends on several variables such as room size, subwoofer placement and listener position. Adjust the phase switch to maximize bass output at the listening position.
10. The EQ switch, located on the front panel, optimizes the subwoofer's performance for both movie and music listening. When in the "Video" position, a special EQ circuit is activated, enhancing low frequencies by approximately 3dB at 32Hz and delivering the full impact and excitement of today's movie soundtracks. When in the "Audio" position, the subwoofer provides the accurate and linear frequency response that is ideal when a natural tonal balance is desired for music listening.
11. Remember: every system, room and listener is different. There are not necessarily any right or wrong settings; any setting you choose will result in excellent performance. Should you decide to fine-tune your system for optimum performance, be patient and trust your ears. It will be worth the effort involved to fully "tweak" your system.

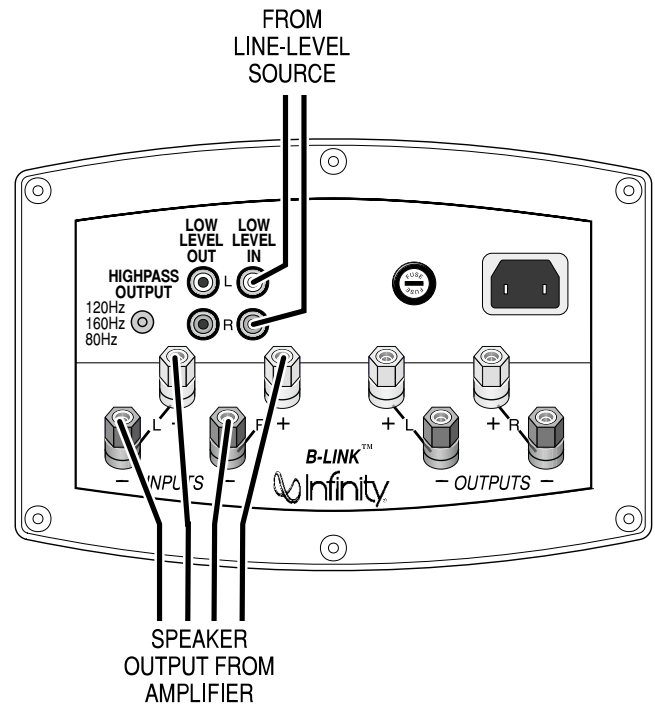
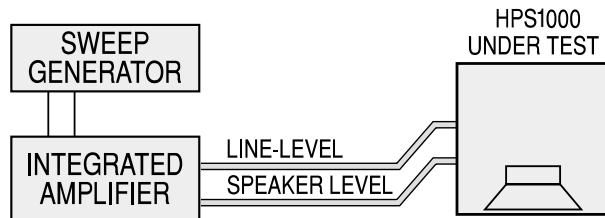
HPS1000 BLOCK DIAGRAM



HPS1000 TEST SET UP AND PROCEDURE

EQUIPMENT

Function generator/signal generator/sweep generator
 Integrated Amplifier
 Multimeter
 Cables - line level (RCA) and speaker cables

**Initial Control Settings**

1. Audio/Video button should be on AUDIO
2. Crossover control should be set to full CW (150).
3. Phase button can be set to either setting.
4. Gain control should be set to full CCW (0)
5. Normal/Direct button should be on NORMAL.

General Function

UUT = Unit Under Test

1. Connect both right and left line level inputs (RCA) to signal generator and UUT. Use Y-cable if necessary from mono source. GAIN control should be full counterclockwise.
2. Turn on generator, adjust to **100mV, 50 Hz**.
3. Plug in power cord to UUT; push the main AC power button ON. Green LED should be lit.
4. Turn GAIN control full clockwise; immediate bass response should be heard and felt from port tube opening.
5. Turn off generator, turn GAIN control fully counterclockwise, disconnect RCA cables.
6. Connect one pair of speaker cables to both pairs (R) and (L) input terminals. Cables should be connected to an integrated amplifier fed by the signal generator.

7. Turn on generator and adjust so that speaker level output is **2.0V, 50 Hz**.
8. Turn GAIN control full clockwise; immediate bass response should be heard and felt from the port tube opening.

Sweep Function

1. Follow steps 1-4 above, using a sweep generator as a signal source.
2. Sweep generator from **20Hz to 300Hz**. Listen to the cabinet and drivers for any rattles, clicks, buzzes or any other noises. If any unusual noises are heard, remove driver and test.

Driver Function

1. Remove driver from cabinet following instructions on page 10.
2. Check DC resistance of driver; it should be **6.7 ohms +/-10%**.
3. Connect a pair of speaker cables to driver terminals. Cables should be connected to an integrated amplifier fed by a signal generator. Turn on generator and adjust so that speaker level output is **6.0V**.
4. Sweep generator from **20Hz to 1kHz**. Listen to driver for any rubbing, buzzing, or other unusual noises.

DISASSEMBLY PROCEDURES

Amplifier Removal

1. Lay the subwoofer on its side on a padded surface, amplifier facing upwards.
2. Locate and remove the (2) Allen head screws (#2) at the bottom of the plastic cover with a 3/32" wrench.
3. Slide the amplifier straight down until it clears the slotted brackets (#4) & (#5); pull away from the cabinet and expose for servicing without further disconnection.
4. To remove individual boards if desired, remove Philips screws and all relevant molex or other connectors.
5. Wires threading through the cabinet, glued in place, should be left intact under all circumstances.

Woofer Removal

1. DO NOT ATTEMPT TO PRY THE GRILLE (#10) OUT OF ITS RECESS.
2. Lay the subwoofer on its side on a padded surface.
3. Remove the (4) rubber foot plugs (#15).
4. Remove the (4) 1" foot screws (#16), remove all four feet.
5. Remove all (12) 2" exposed bottom panel screws (#13).
6. Pull the bottom panel (#12) out of the cabinet - one way to accomplish this is to partially screw one of the 2" screws back into a threaded "foot" hole and pull on the screw. Lift the bottom panel & woofer (#9) out of the cabinet.
7. Unplug both woofer terminals; remove all (8) 3/4" screws (#11).

WHEN SERVICING THIS AMPLIFIER:

1. Do not touch the metal frame of the woofer (if removed from the cabinet) when driving the amplifier at high power levels. In the unlikely event that the output devices in the amplifier fail and present an open circuit during their operation, AND the driver voice coil was to come in contact with the motor assembly, hazardous voltage could be present at the woofer frame.
2. When 120/230v-based test equipment is connected to the amplifier in any way, use of a 1000W isolation transformer (Stancor model GIS-1000 or similar) on the subwoofer is necessary for safety; in addition, an isolator plug, (a three-to-one pin adapter sometimes called a "cheater plug") should be used on the power cord plug of the test equipment being used.

HPS 1000 (120 & 230 V) TEST PROCEDURE

Idle current check, and output stage bias adjustment :

- Remove and expose amplifier assembly by following instructions on the preceding page. All connectors must remain intact.
- Locate and disconnect the CD+ connector on the main board; insert a DC Ammeter set to a low range between the two connectors.
- Locate and adjust R13 and R28 potentiometers on the main board near the connector to maximum CCW.
- Adjust R13 and R28 on the Feature-Linear board fully counter clockwise.
- Apply the appropriate AC power to unit, switch AC power on.
- Adjust R28 until current meter reads 5 mA + idle.
- Adjust R13 until current meter reads 10 mA + idle.
- Switch AC power off.
- Remove current meter and connect CD+ harness to CD+ connector on the Feature-Linear board.

Audio Test :**Check noise:**

- Connect a true RMS voltmeter across the power amplifier output,
- (SPKR+ and SPKR- on the Feature-Linear board).
- Vary the Gain and Frequency controls from minimum to maximum, verifying the noise reading on the voltmeter remains less than 8 mV, AC.

- Adjust the Gain control to minimum.
- Apply an 800 mV, 60 Hz signal to the Left RCA low level input.
- Vary all controls while looking at the oscilloscope, watch and listen for any irregularities, or distortion.

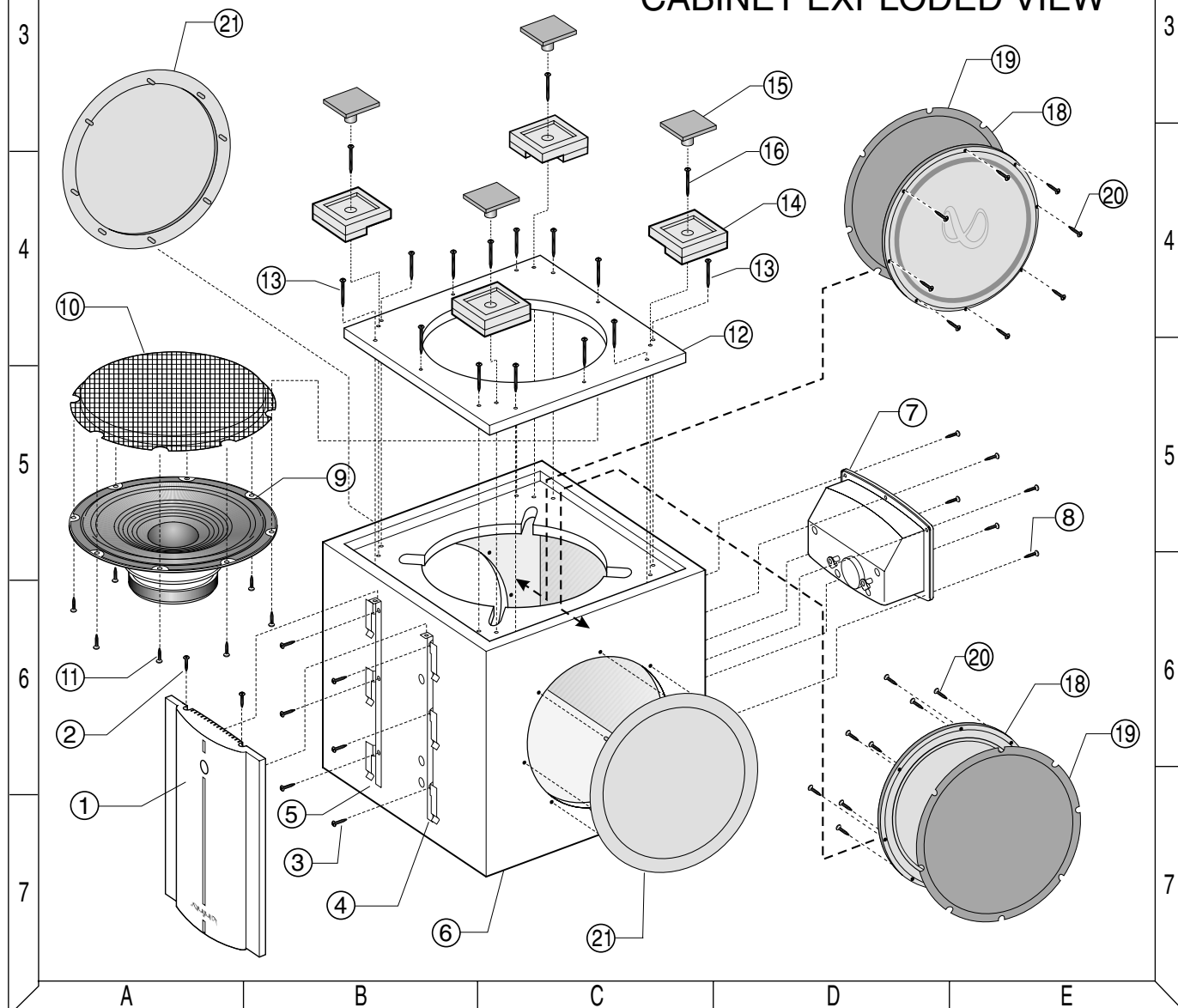
Check power:

- Place a 7 Ω resistive load across the power amplifier output.
- Connect a true RMS voltmeter across the power amplifier output.
- Set Frequency control to maximum.
- Adjust gain control to verify the amplifier will deliver:
 - At least 75 Volts AC, "clean" - no visible distortion
 - At least 80 Volts AC, with visible "rounding of the peaks" distortion.
 - DO NOT RUN AMPLIFIER AT FULL POWER CONTINUOUSLY, FOR MORE THAN 5 SECONDS.

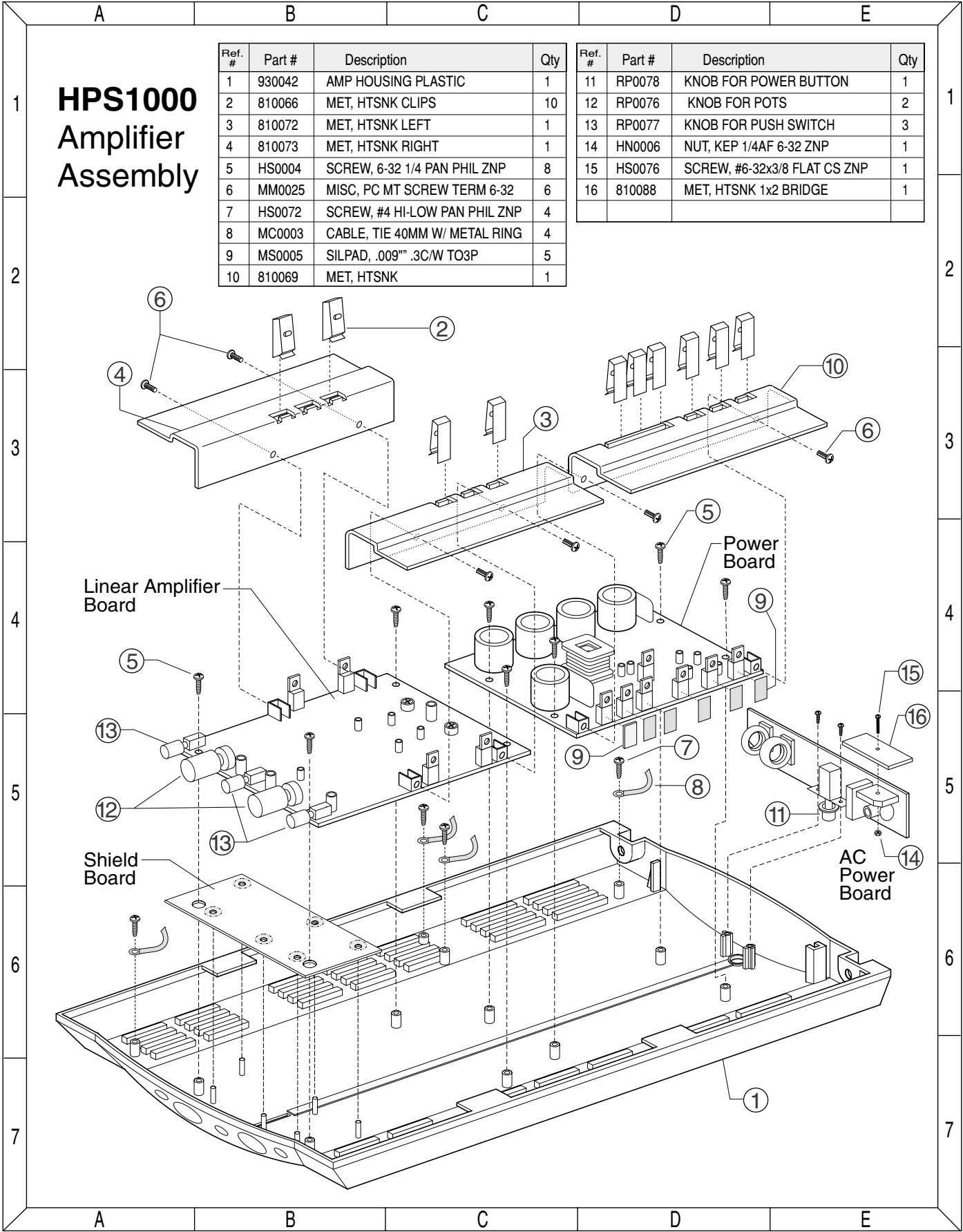
HPS1000 CABINET EXPLODED VIEW

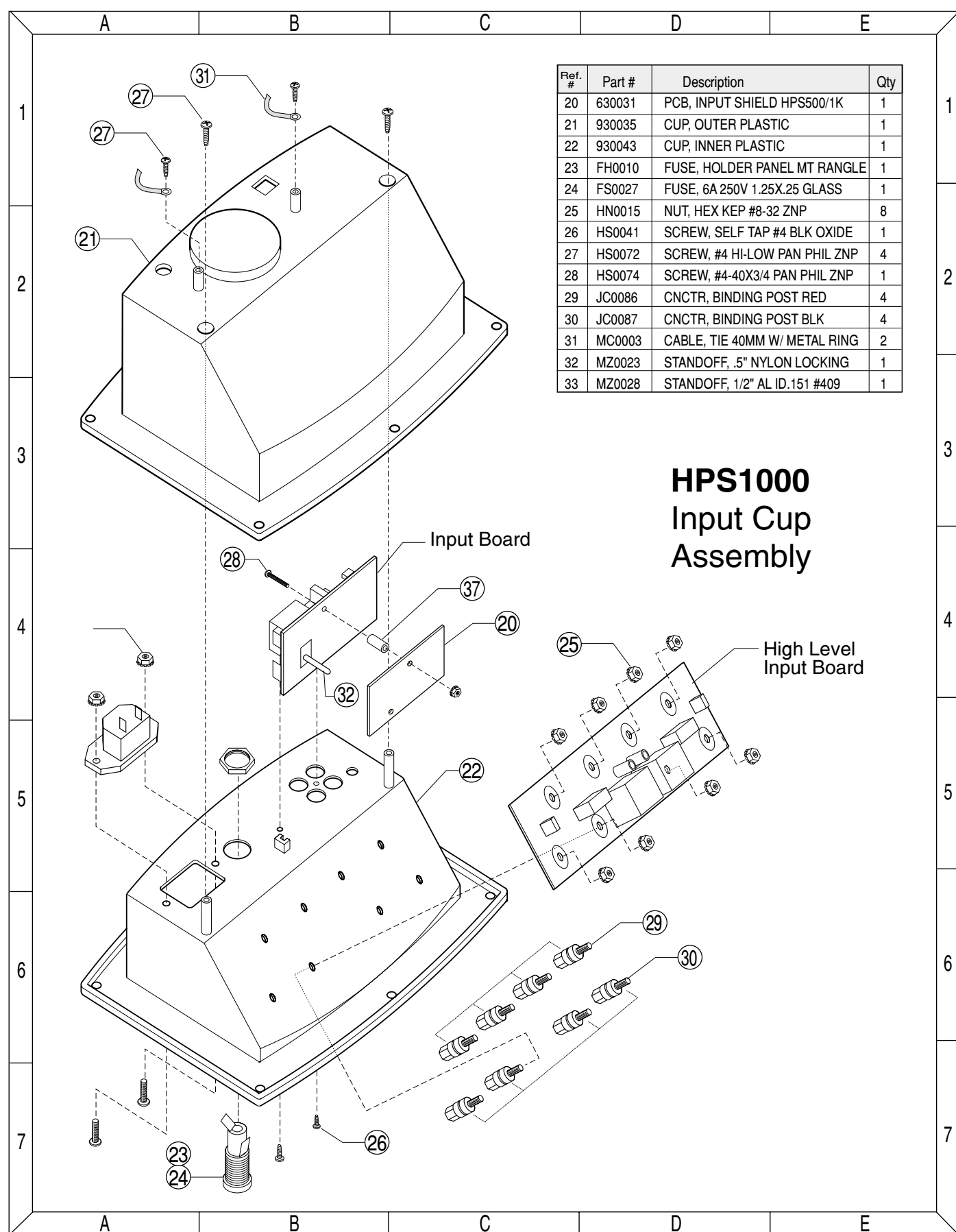
Ref.#	Description	Part Number	Qty.
1	AMPLIFIER ASSEMBLY 120V	NOT FOR SALE	1
	AMPLIFIER ASSEMBLY 230V	NOT FOR SALE	1
2	AMP. MOUNTING SCREWS, MS, BHXS 8-32 x .5 BLACK	901701-008	2
3	BRACKET SCREWS, PB, PPH, #8 x .75"	900101-012	6
4	AMP. ASSY. BRACKET, LEFT	334189-001	1
5	AMP. ASSY. BRACKET, RIGHT	334189-002	1
6	CABINET HPS1000	NOT FOR SALE	1
7	INPUT CUP ASSEMBLY 120V	334193-005	1
	INPUT CUP ASSEMBLY 230V	334193-009	1
8	INPUT CUP SCREWS, PB, PPH, #6 x .75"	903401-012	6
9	15" WOOFER	333959-001	1
10	GRILLE	333767-001	1

Ref.#	Description	Part Number	Qty.
11	WOOFER SCREWS, PB, PPH, #8 x .75"	334211-001	8
12	CABINET BOTTOM	334213-001	1
13	BOTTOM SCREWS, FLH BLACK #8 x 2"	903101-016	12
14	FEET	334211-001	4
15	FOOT PLUGS	334213-001	4
16	BOTTOM PANEL GASKET (NOT SHOWN)	333944-001	1
17	GRILLE GASKET	334184-001	2
18	PASSIVE RADIATOR (2 PER SET)	333784-001	2
19	PASSIVE RADIATOR GASKET (2PER SET)	333954-001	2
20	PASSIVE RADIATOR SCREWS	NOT FOR SALE	16
21	TRIM RINGS (2 PER SET)	334184-001	2

HPS1000
CABINET EXPLODED VIEW

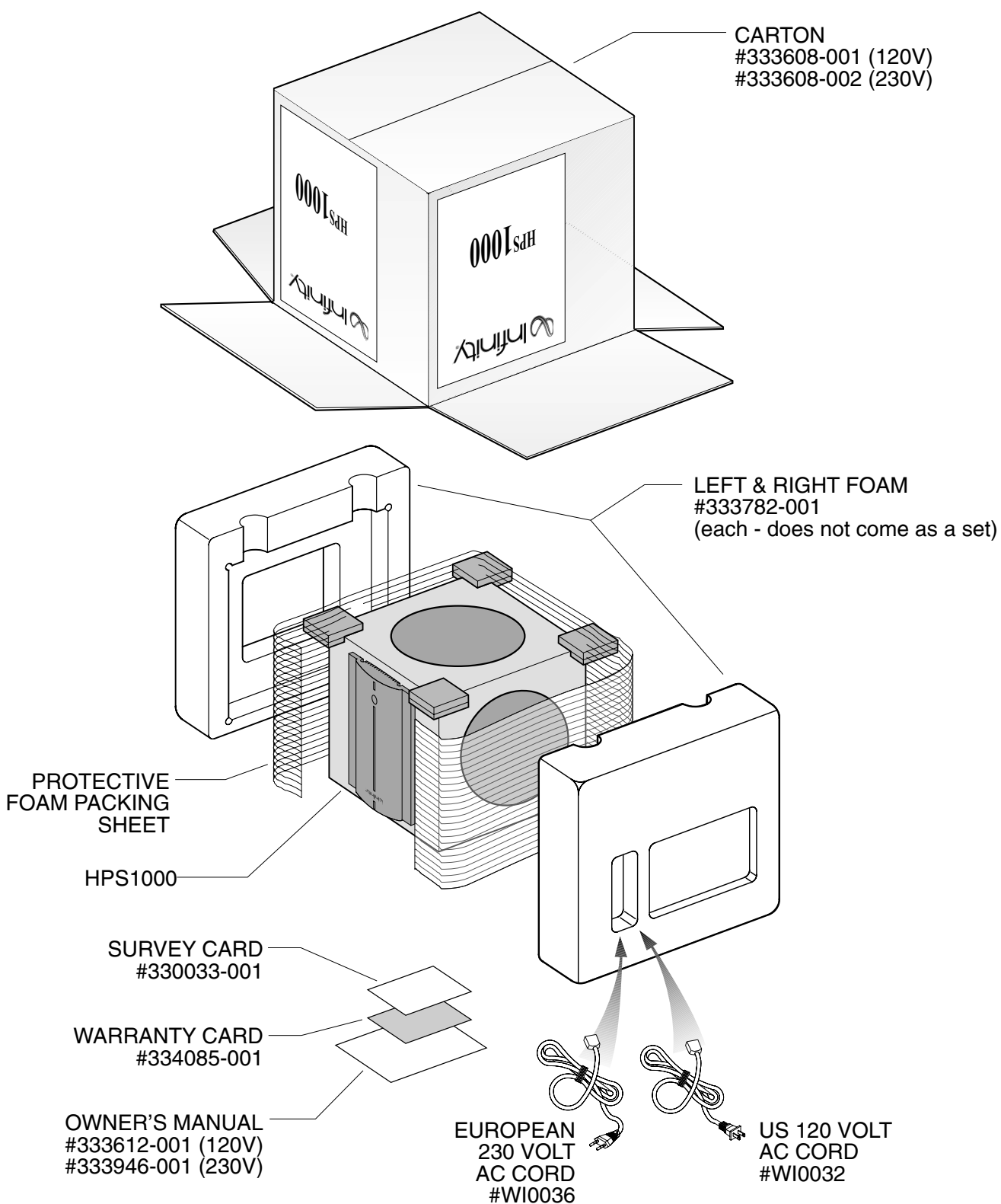
HPS1000 AMP ASSEMBLY EXPLODED VIEW



HPS1000 INPUT CUP ASSEMBLY EXPLODED VIEW

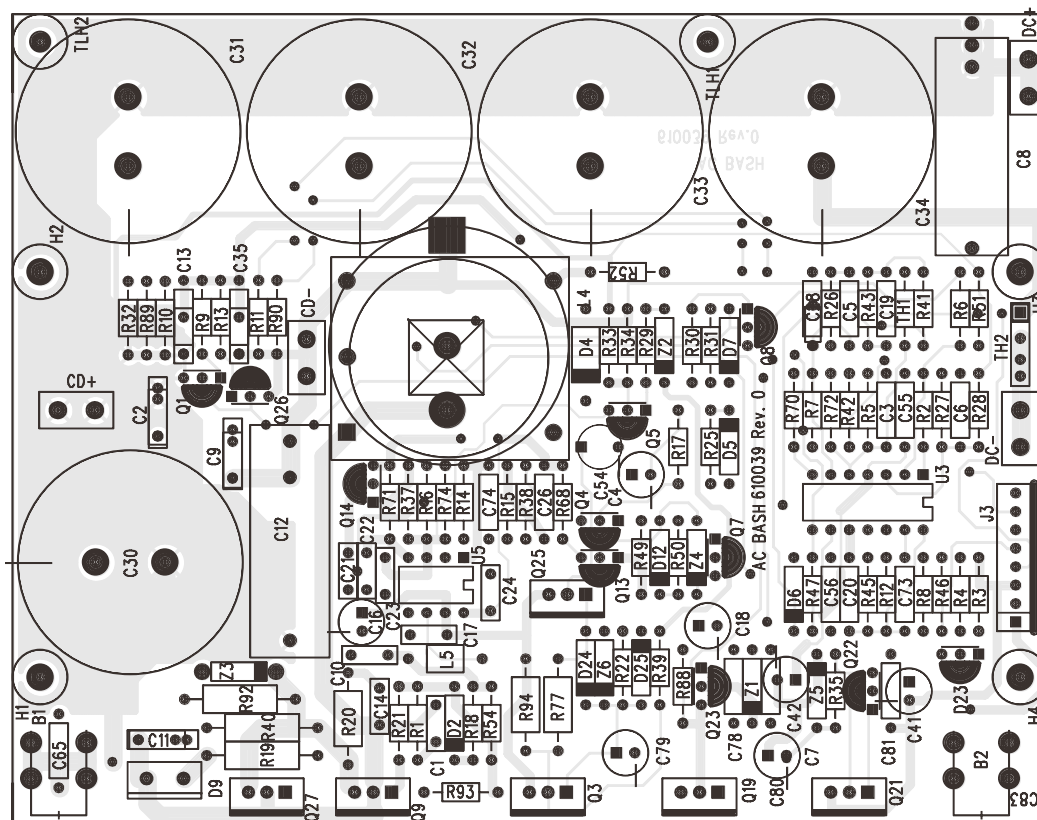
HPS1000 PACKING

NOTE: For packing and unpacking turn the carton up-side-down.

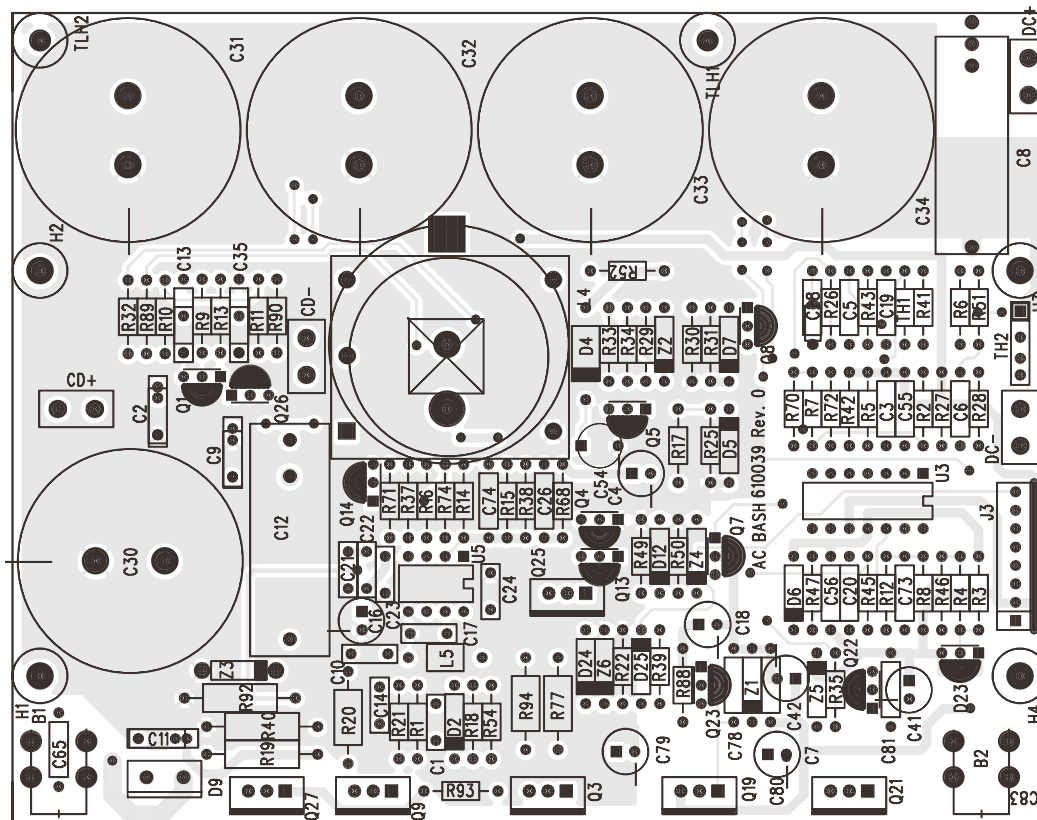


HPS1000 POWER SUPPLY PCB

Power Supply PCB



Solder Side Traces as shown
through the board



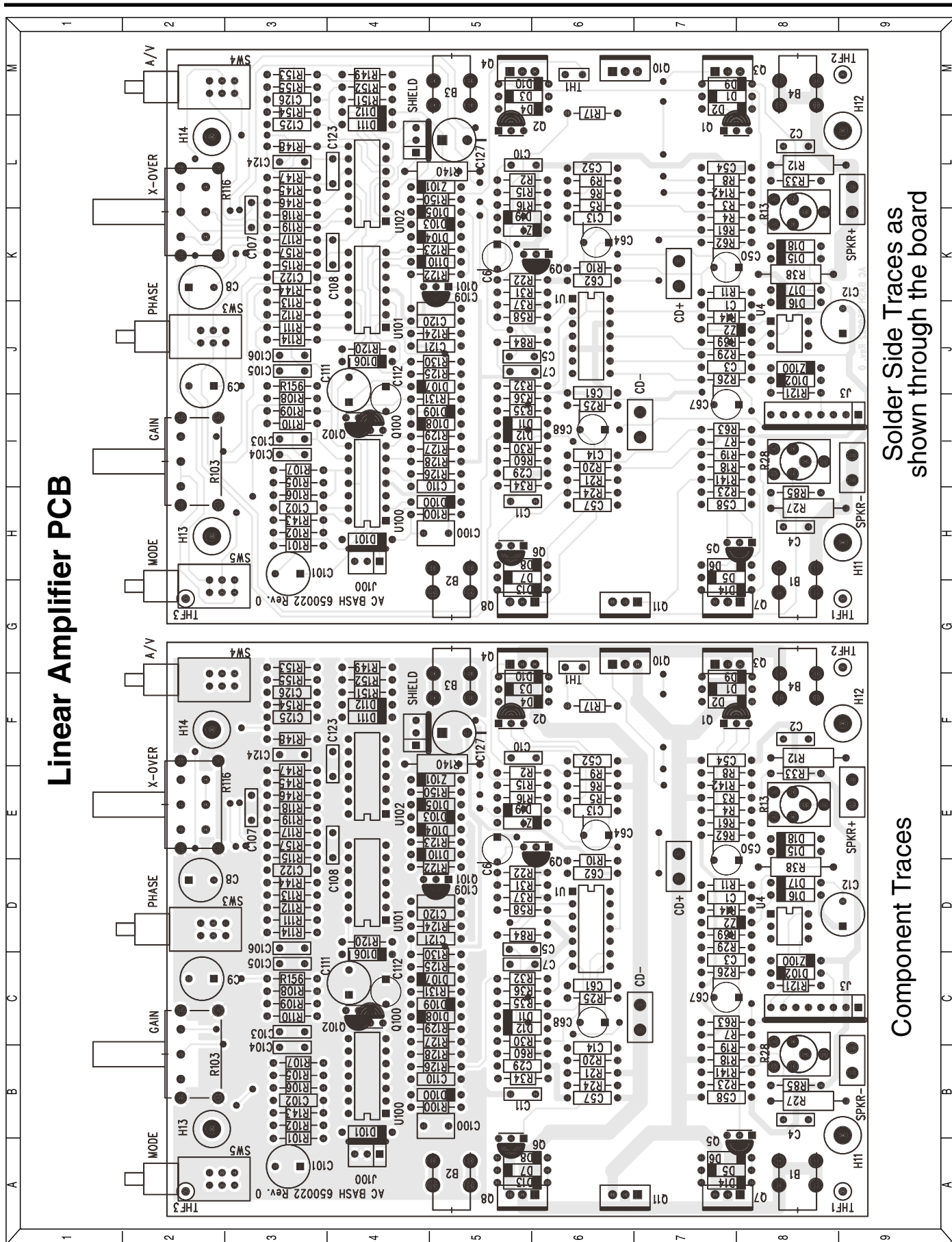
Component Traces

HPS1000 LINEAR AMPLIFIER PCB

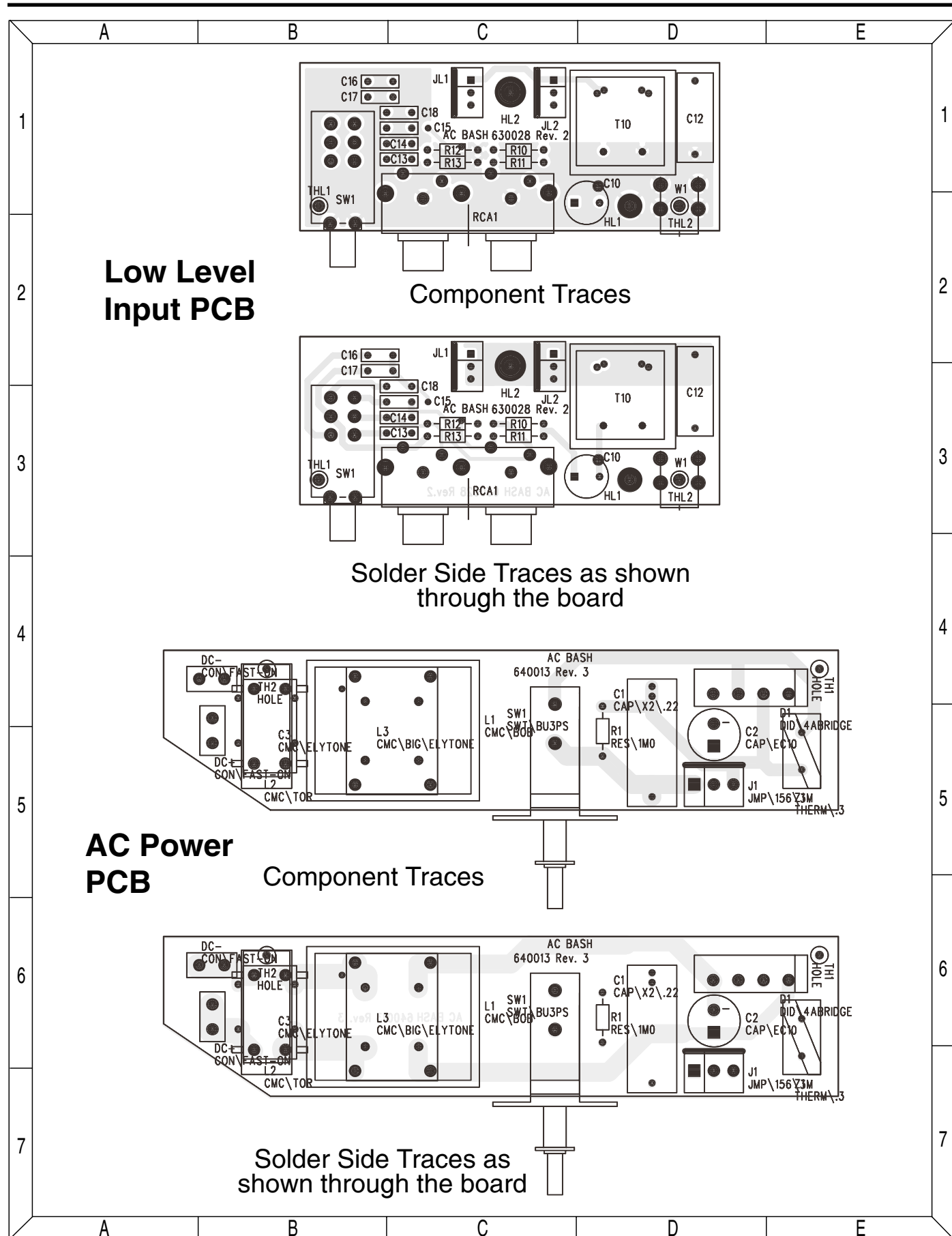
Linear Amplifier PCB

Solder Side Traces as
shown through the board

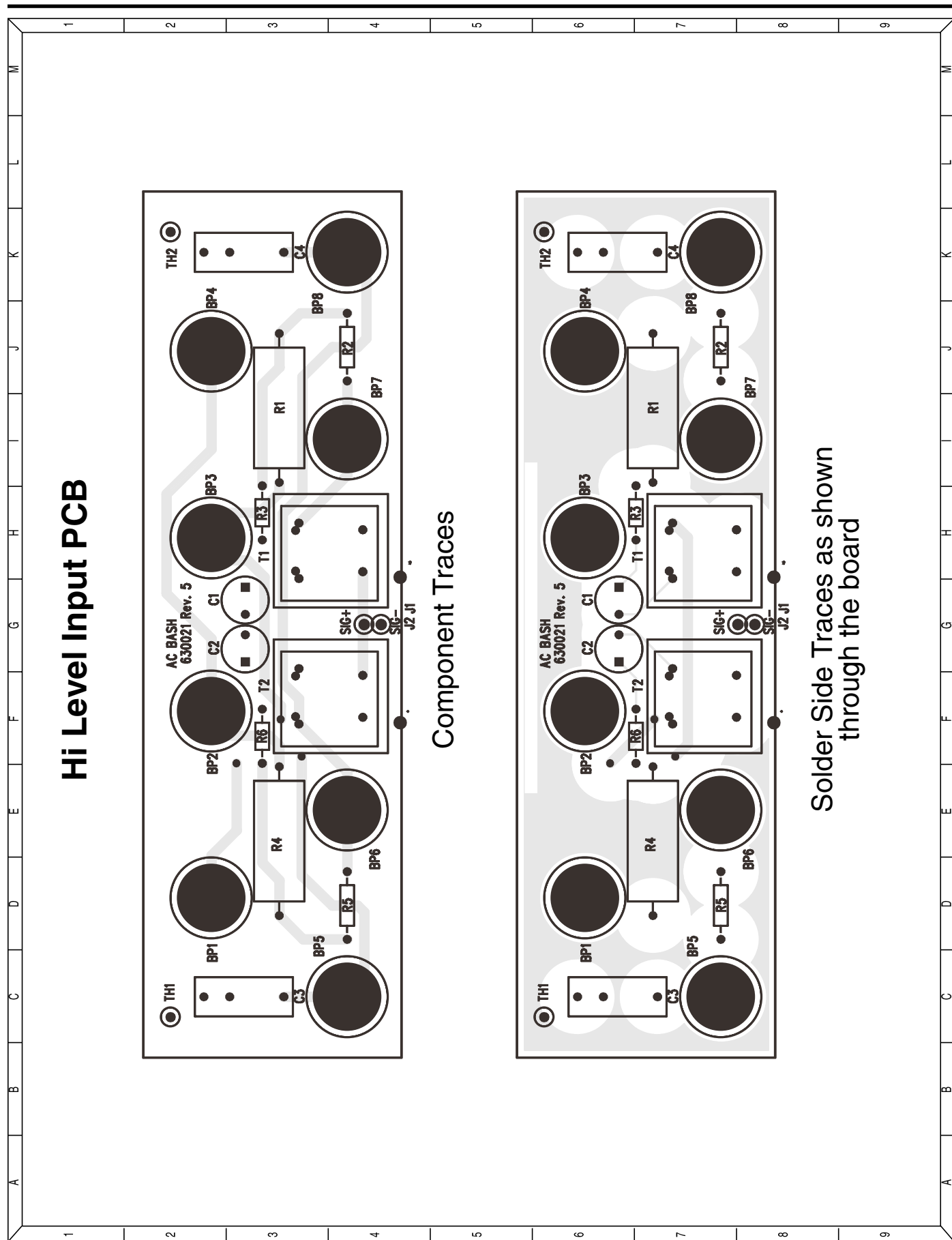
Component Traces



HPS1000 AC POWER & LOW LEVEL INPUT PCB's



HPS1000 HI LEVEL INPUT PCB



HPS1000 PARTS LIST

REF #	PART #	DESCRIPTION	QTY	REF #	PART #	DESCRIPTION	QTY
Power supply PCB				D9	DR0085	RECT, 8A 400V TO220AC MUR860	1
				D23	DZ0018	ZENER, 2.5-37V SHUNT TL431CLP	1
				Z1, 5, 6	DZ0002	ZENER, 500mW 12V 5% 1N5242B	3
Integrated Circuits				Resistors			
U3	UA0003	OPAMP, QUAD 14PIN DIL LM324N	1	R2, 27, 37	RM0180	RES, MF 4.99K 1/4W 1%	3
U5	UP0004	PWM, 8PIN DIL UC3842N	1	R3	RC0037	RES, CF 2.0K 1/4W 5%	1
Transistors				R4	RM0247	RES, MF 38.3K 1/4W 1%	1
Q1, Q23	QB0017	TRANS, NPN 150V 0.6A 2N5551	2	R5	RM0276	RES, MF 294K 1/4W 1	1
Q3	QB0033	TRANS, NPN 250V 1A TO220 TIP47	1	R6, 10, 11, 28, 70	RM0011	RES, MF 100K 1/4W 1%	5
Q4, Q13, Q14	QB0002	TRANS, NPN 40V .6A TO92 2N4401	3	R7, 47	RM0120	RES, MF 30.1K 1/4W 1%	2
Q5, Q7	QB0014	TRANS, PNP MPSA92 TO92	2	R8	RC0127	RES, CF 30K 1/4W 5%	1
Q8	QB0050	TRANS, TO92 MPA-44	1	R9, 13	RM0079	RES, MF 750 1/4W 1%	2
Q9, Q27	QM0015	MOSFET, IRF640 TO220AB	2	R12	RC0116	RES, CF 330K 1/4W 5%	1
Q19	QB0019	TRANS, NPN TIP29B/C TO220	1	R14, 15, 35, 88	RM0113	RES, MF 20.0K 1/4W 1%	4
Q21	QB0013	TRANS, PNP TIP30C TO220	1	R16	RM0089	RES, MF 2.43K 1/4W 1%	1
Q22, Q26	QB0018	TRANS, PNP 150V 0.6A 2N5401	2	R17	RC0006	RES, CF 10K 1/4W 5%	1
Capacitors				R18, 39, 89, 90	RM0336	RES, MF 47 0.6W 1% FLAMEPROOF	4
C2, 9, 11	CC0021	CAP, C 470PF 1KV 10%	3	R19	RX0072	RES, MO 100 1W 5%	1
C3, 73	CC0020	CAP, CA 470PF 100V 5%	2	R20	RX0080	RES, MO 4.7 2W 5% (ELEVATED 5MM)	1
C4, 79	CE0010	CAP, E 22UF 50V 20% 105C .1LS"	2	R21, 93	RM0339	RES, MF 10 0.6W 1% FLAMEPROOF	2
C6	CC0040	CAP, CA 4700PF 100V 10%	1	R22	RM0147	RES, MF 16.2K 1/4W 1%	1
C10	CC0020	CAP, CA 470PF 100V 5%	1	R23	RC0273	RES, ZERO OHM 1/4W	1
C12	CF0146	CAP, F 6.8UF 250V 10% 27MMLS	1	R25, R51	RC0083	RES, CF 100K 1/4W 5%	2
C13, 35, 65	CC0059	CAP, CA .1UF 100V 20%	3	R26	RM0126	RES, MF 47.0K 1/4W 1%	1
C14	CC0032	CAP, C 2200PF 600V 10%	1	R30, 50, 68, Z4	RM0001	RES, MF 1.00K 1/4W 1%	4
C17	CC0078	CAP, C .22UF 50V 10% .2LS	1	R31	RM0021	RES, MF 1.82K 1/4W 1%	1
C19, 20	CC0065	CAP, CA 2200PF 50V 5%	2	R32	RM0260	RES, MF 1.0M 1/4W 1%	1
C21	CF0008	CAP, F 2200PF 100DC 63AC 5%	1	R38	RM0111	RES, MF 17.8K 1/4W 1%	1
C22	CC0017	CAP, C 330PF 100V 10%	1	R40, R92	RW0022	RES, WW 0.1 2W 5%	2
C23	CC0095	CAP, C 470PF 100V 5	1	R41	RM0082	RES, MF 1.21K 1/4W 1%	1
C24	CC0079	CAP, C .1UF 50V 20% .1LS	1	R43	RM0031	RES, MF 3.32K 1/4W 1%	1
C28	CC0087	CAP, CA .01UF 100V 20%	1	R45	RM0035	RES, MF 4.75K 1/4W 1%	1
C30, 31, 32, 33, 34	CE0121	CAP, E 470UF 200V 20% 30X25	5	R46	RM0205	RES, MF 22.6K 1/4W 1%	1
C41, 42	CE0003	CAP, E 2.2UF 50V 20% 105C	2	R49	RM0065	RES, MF 200 1/4W 1%	1
C55, 56	CC0082	CAP, CA .1UF 50V 20%	2	R54	RM0012	RES, MF 100 1/4W 1%	1
C74	CC0072	CAP, CA 100PF 100V 10%	1	R71	RM0002	RES, MF 10.0K 1/4W 1%	1
Diodes				R74	RM0043	RES, MF 6.81K 1/4W 1%	1
D2, 5, 6, 7, 12, 24, 25	DS0001	RECT, 100mA 75V SIGNAL 1N4148T	7	R77	RC0082	RES, CF 100K 1/2W 5%	1
				R72	RM0114	RES, MF 22.1K 1/4W 1%	1

REF #	PART #	DESCRIPTION	QTY	REF #	PART #	DESCRIPTION	QTY
R94	RC0091	RES, CF 150K 1/2W 5%	1	Q102	QB0049	TRANS, TO92 2N3819 (MUST BE SELECTED)	1
L3	RC0273	RES, ZERO OHM 1/4W	1				
Miscellaneous				Capacitors			
B1, 2	MM0025	MISC, PC MT SCREW TERM 6-32	2	C1, 3	CC0072	CAP, CA 100PF 100V 10%	2
CD+, DC+	MT0003	TERM, KWIKDISC .25 PCB MT	2	C2, 4	CF0119	CAP, F .047UF 100V 5% 5MM	2
CD-	MT0023	TERM, FASTON MALE PCMT 187X032	1	C5, 7, 10, 11, 103, 104, 105, 106, 123, 124	CF0045	CAP, F .1UF 63DC 5%	10
DC-	MT0031	TERM, FASTON .205 MALE PC MT	1	C6, 50, 64, 67, 68	CE0098	CAP, E 22UF 50V 20% 5X11 .2LS	5
J3	JH0074	CNCTR, HEADER 8PIN LOCKING .1C	1	C8, 9, 12, 101	CE0106	CAP, E 22UF 35V BP 6X11 .2LS	4
L4	540130	IND, CM CHOKE 150UH ELYTONE	1	C29, 61, 62, 110, 120, 121	CC0082	CAP, CA .1UF 50V 20%	6
R24	KS0021	SURGISTOR, 4 8A 70J SL154R008	1	C52, 54, 57, 58	CC0059	CAP, CA .1UF 100V 20%	4
	810066	MET, HTSNK CLIP HPS SERIES FET CLIPS ON THE POWER BRD	6	C100	CF0099	CAP, F .68UF 63V 5	1
	810069	MET, HTSNK HPS1000 PWR SUPPLY HEATSINK PLATE FOR POWER	1	C102	CF0094	CAP, F .047UF 100V 5% 10MM	1
	HN0006	NUT, KEP 1/4AF 6-32 ZNP USED ON L4 (540130)	1	C109	CC0098	CAP, CA .047UF 50V 10	1
	HS0004	SCREW, 6-32 1/4 PAN PHIL ZNP USED ON MM0025	2	C108	CF0035	CAP, F .022UF 100V 5%	1
	HS0079	SCREW, 6-32 1.5 NYLON PAN USED ON L4 (540130)	1	C111	CE0003	CAP, E 2.2UF 50V 20% 105C	1
	HW0030	WASHER, FLAT .375OD #8 NYLON USED ON L4 (540130)	1	C122	CF0090	CAP, F .022UF 100V 5% 10MMLS	1
	KS0017	THERMISTOR, 200K @ 25C NTC FINISHING KLUDGE	1	C123, 124	CF0045	CAP, F .1UF 63DC 5% 5MMLS	2
	MS0005	SILPAD, .009" .3C/W TO3P USED WITH 5 FETS	5	Diodes			
	MS0014	MISC, CERAMIC PLATE TO-220 USED WITH 1 FET	1	D1-10, D12-18, D100-110	DS0001	RECT, 100mA 75V SIGNAL 1N4148T	28
	RM0037	RES, MF 51K1 1/4W 1% FINISHING KLUDGE	1	Z1, 2	DZ0021	ZENER, 500MW 15V 5% 1N5245B	2
Linear Amp/Feature PCB's				Resistors			
Integrated Circuits				C112	RM0260	RES, MF 1M 1/4W 1%	1
U1, 100	UA0009	OPAMP, QUAD 14P DIL TL074/084	2	R2, 34, 120	RM0001	RES, MF 1.00K 1/4W 1%	3
U4	UF0013	OPTOCOUPLER, 6PIN MOC3012	1	R3, 6, 18, 21	RM0043	RES, MF 6.81K 1/4W 1%	4
U101, 102	UA0003	OPAMP, QUAD 14PIN DIL LM324N	2	R4, 5, 19, 20	RM0031	RES, MF 3.32K 1/4W 1%	4
Transistors				R7, 58, 1, 62, 63	RM0093	RES, MF 4.53K 1/4W 1%	5
Q1, 5	QB0017	TRANS, NPN 150V 0.6A 2N5551	2	R8, 9, 23, 24, 141, 142	RM0071	RES, MF 332 1/4W 1%	6
Q2, 6	QB0018	TRANS, PNP 150V 0.6A 2N5401	2	R10, 11, 25, 26	RM0024	RES, MF 2.21K 1/4W 1%	4
Q3, 7, 10, 11	QM0032	MOSFET, IRF9640 TO220AB	4	R12, 27	RX0074	RES, MO 4.7K 1W 5	2
Q4, 8	QM0015	MOSFET, IRF640 TO220AB	2	R13, 28	RP0056	POT, 5K 8MM HOR TOP ADJ/COVER	2
Q9	QM0035	JFET, N-CH J111 TO92	1	R14, 29	RM0129	RES, MF 53.6K 1/4W 1%	2
Q101	QB0002	TRANS, NPN 40V .6A TO92 2N4401	1	R15, 30	RM0029	RES, MF 3.01K 1/4W 1%	2
				R16, 128	RC0083	RES, CF 100K 1/4W 5%	2
				R22	RM0039	RES, MF 5.11K 1/4W 1%	1
				R31, 84	RM0103	RES, MF 10.5K 1/4W 1%	2

REF #	PART #	DESCRIPTION	QTY
R32, 113, 119, C126, D110	RC0273	RES, ZERO OHM 1/4W	5
R33, 85	RM0073	RES, MF 392 1/4W 1%	2
R35, 36, 105	RM0113	RES, MF 20.0K 1/4W 1%	3
R37	RM0304	RES, MF 7.87K 1/4W 1%	1
R38	RX0097	RES, MO 3.9K 2W 5%	1
R39, 60, 121, 122, 123, 124, 146, 152	RC0006	RES, CF 10K 1/4W 5%	8
R100	RM0085	RES, MF 2.00K 1/4W 1%	1
R101	RM0255	RES, MF 7.15K 1/4W 1%	1
R102	RM0072	RES, MF 365 1/4W 1%	1
R103	RP0063	POT, A10K SINGLE/BACKET	1
R106	RM0275	RES, MF 11.8K 1/4W 1	1
R107	RM0201	RES, MF 32.4K 1/4W 1%	1
R108	RM0366	RES, MF 3.24K 1/4W 1%	1
R109	RM0307	RES, MF 1.15K 1/4W 1%	1
R111	RM0105	RES, MF 12.1K 1/4W 1%	1
R110	RM0037	RES, MF 51.1K 1/4W 1%	1
R114	RM0196	RES, MF 301K 1/4W 1%	1
R115, 117	RM0363	RES, MF 24.3K 1/4W 1%	2
R116	RP0065	POT, B50K DUAL / BRACKET +/- 10%	1
R125, 129, 149, 150, 151	RM0002	RES, MF 10.0K 1/4W 1%	5
R127, 131	RC0037	RES, CF 2.0K 1/4W 5%	2
R130	RC0004	RES, CF 1.0M 1/4W 5%	1
R136, 137, 156, 157	RM0011	RES, MF 100K 1/4W 1%	4
R140	RC0001	RES, CF 1.0K 1/2W 5%	1
R143	RM0120	RES, MF 30.1K 1/4W 1%	1
R144	RM0180	RES, MF 4.99K 1/4W 1%	1
R145	RM0134	RES, MF 121K 1/4W 1%	1
R147	RM0170	RES, MF 59K 1/4W 1%	1
R148	RM0041	RES, MF 61.9K 1/4W 1%	1
Z100	RM0352	RES, MF 2.05K 1/4W 1%	1

Miscellaneous

	JH0028	CNCTR, HEADER 3PIN .100CTR SHIELD	1
J100	JH0063	CNCTR, HEADER 3PIN .1CTR	1
J3	JH0074	CNCTR, HEADER 8PIN LOCKING .1C	1
TH1	KS0019	THERMISTOR, PTH9L04BD22TS2F510	1
B1, 2, 3, 4	MM0025	MISC, PC MT SCREW TERM 6-32	4

REF #	PART #	DESCRIPTION	QTY
CD+, SPKR-	MT0003	TERM, KWIKDISC .25 PCB MT	2
CD-	MT0023	TERM, FASTON MALE PCMT 187X032	1
SPKR+	MT0031	TERM, FASTON .205 MALE PC MT	1
SW3, SW4, SW5	SR0017	SWITCH, 2 POLE 2PDT	3
	810066	MET, HTSNK CLIP HPS SERIES CLIPS FOR FETS	6
	810072	MET, HTSNK LEFT HPS1000 F/L LEFT SIDE HEATSINK FOR THE F	1
	810073	MET, HTSNK RIGHT HPS1000 F/L RIGHT SIDE HEATSINK FOR THE	1
	HS0004	SCREW, 6-32 1/4 PAN PHIL ZNP USED WITH MM0025	4

AC Power PCB

C1	CF0057	CAP, FX .22UF 250V 10%	1
C2	CE0004	CAP, E 2.2UF 450V 20% 85C	1
D1	DB0006	RECT, 8A 400V BRIDGE	1
	HN0006	NUT, KEP 1/4AF 6-32 ZNP USED ON THE BRIDGE HEATSINK	1
	HS0076	SCREW, #6 -32X3/8 FLAT CS ZNP USED ON THE BRIDGE HEATSINK	1
J1	JH0044	CNCTR, HEADER 3PIN .156CTR	1
L2	520025	XFMR, CURRENT YT-7102-1	1
L1	540124	IND, CM CHOKE	1
	810088	MET, HTSNK 1X2 BRIDGE USED ON THE BRIDGE	1
Z1	KV0001	VARIATOR, 275V 100J .6W	1
DC+	MT0003	TERM, KWIKDISC .25 PCB MT	1
DC-	MT0031	TERM, FASTON .205 MALE PC MT	1
R1	RC0004	RES, CF 1M 1/4W 5%	1
SW1	SR0009	PUSH, TV5 MAIN POWER SWITCH	1

Shield board PCB

LED1, LED2	DL0021	LED, 3MM GREEN	2
J1	JC0118	CNCTR, 3PIN LED HARNESS 4"	1
	MZ0026	STANDOFF, 7.5MM LED 2PIN TO SUPPORT THE LED	2

Final Assembly

REVISION	930042	MISC, HPS500 AMP HSG PLASTIC	1
	DL0023	LED, REFLECTOR USED ON THE AMP HOUSING	1
	HS0072	SCREW, #4 HI-LOW PAN PHIL ZNP USED TO ATTACH THE CABLE TIE	6
	HS0073	SCREW, #6 HI-LOW PAN PHIL ZNP 4PC ON CLASS D BOARD	12

REF #	PART #	DESCRIPTION	QTY
		4PC ON FEATURE LINEAR BOARD 4PC WITH MC0003	
	JC0071	CNCTR, FEM-FEM HARNESS 8PIN 9" FROM CLASS D BD TO FEA/LIN B	1
	JC0114C	CNCTR, 3PIN MALE/3PIN FEM LOCK AC CONNECT TO JC0114A ON INP	1
	JC0117D	CNCTR, 3PIN FEM/3PIN FE 30.75" CONNECT TO JC0117A ON THE IN	1
	JC0135	CNCTR, CLASSD PWR CBL 5.75/6.5" CD+/- FROM CLASS D BD TO FEA	1
	JC0136	CNCTR, DC POWER CABLE 4.25"/5" DC+/- FROM CLASS D BD TO AC	1
	JC0138	CNCTR, SPEAKER CABLE 24"/26" ON THE FEA LIN BOARD	1
	MC0003	CABLE, TIE 40MM W/ METAL RING CABLE TIE WITH RING TERMINAL	4
	RP0076	POT, KNOB FOR HPS SERIES	2
	RP0077	POT, KNOB FOR HPS SWITCH	3
	RP0078	KNOB FOR THE POWER BUTTON	1
	TS0017	FIBREGLASS, HT210 #2AWG 3" SLEEVING FOR JC0138	1

Hi level Input PCB

	630021	PCB, INPUT HI-LVL HPS SERIES	1
C1, 2	CE0106	CAP, E 22UF 35V BP 6X11 .2LS	2
C3, 4	CF0143	CAP, FY1 4700PF 250V 20	2
R1, 4	RW0037	RES, WW 470 5W 5	2
R2, 5	RC0118	RES, CF 15 1/2W 5%	2
R3, 6	RM0085	RES, MF 2.00K 1/4W 1%	2
J1/J2	JC0139	CNCTR, HARNESS HI-LVL 8.5"	1
T1, 2	500086	XFMR, POWER AUDIO YT-6821	2

Low Level Input PCB

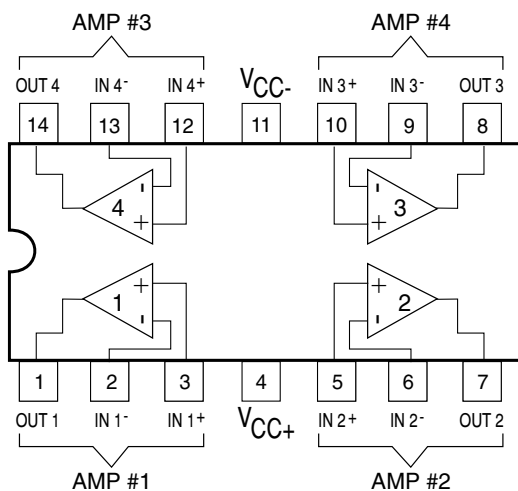
C10	CE0106	CAP, E 22UF 35V BP 6X11 .2LS	1
C12	CF0143	CAP, FY1 4700PF 250V 20	1
C13, 16	CF0128	CAP, F .033UF 100V 5MMLS	2
C14, 15, 17, 18	CF0045	CAP, F .1UF 63DC 5% 5MMLS	4
R10, 11	RM0029	RES, MF 3.01K 1/4W 1%	2
R12, 13	RM0002	RES, MF 10.0K 1/4W 1%	2
T10	500086	XFMR, POWER AUDIO YT-6821	1
RCA1	JC0052	CNCTR, RCA QUAD JACK	1
J34, 36	JH0063	CNCTR, HEADER 3PIN .1CTR	2
W5	MM0025	MISC, PC MT SCREW TERM 6-32	1
SW1	SR0022	SWITCH, DPDT TOGGLE C/W CAP PC	1
FUSE	FS0027	FUSE, 6A 250V 1.25X.25 GLASS	1

REF #	PART #	DESCRIPTION	QTY
Miscellaneous			
	930035	OUTER PLASTIC CUP	1
	930043	INNER PLASTIC CUP	1
	FH0010	FUSE, HOLDER PANEL MT RANGLE	1
	HN0001	NUT, KEP 3/16AF 4-40 ZNP USED ON THE IEC CONNECTOR	2
	HN0015	NUT, HEX KEP #8-32 ZNP USED ON THE BINDING POSTS	8
	HS0041	SCREW, SELF TAP #4 BLK OXIDE USED ON THE RCA	1
	HS0055	SCREW, #4-40X1/2 PAN PHIL BLK USED ON THE IEC CONNECTOR	2
	HS0065	SCREW, #6-32X1/4 PAN PHIL BLK USED ON MM0025	1
	HS0072	SCREW, #4 HI-LOW PAN PHIL ZNP TO SECURE THE CUPS AND CABLE TIES	4
	HS0074	SCREW, #4-40X3/4 PAN PHIL ZNP BETWEEN SHIELD AND INPUT PCB	2
	JC0076	CNCTR, AC IEC SOCKET .250TAB ON THE INNER PLASTIC CUP	1
	JC0086	CNCTR, SINGLE BINDING POST RED ON THE INNER PLASTIC CUP	4
	JC0087	CNCTR, SINGLE BINDING POST BLK ON THE INNER PLASTIC CUP	4
	JC0114A	CNCTR, 3PIN FEM/2XFEM FASTON CONNECT TO MATING HARNESS ON PWR	1
	JC0117A	CNCTR, 3PIN FEM/3PIN MALE 11 CONNECTO TO MATCHING HARNESS	1
	MM0027	RUBBER GROMMETS 2PER ON THE TRANSFORMER 2PER ON THE OUTER CUP ECR 07/15/99 JODI	4
	MZ0023	STANDOFF, .5" NYLON LOCKING	1
	MZ0028	STANDOFF, 1/2" AL ID.151 #409 BETWEEN INPUT SHIELD AND INPUT PC	1
	WI0032	WIRE, POWER CORD SPT2/IEC 8FT	1
	WI0034	WIRE, IEC TO FUSEHOLDER #18 4" IEC TO FUSE HOLDER	1

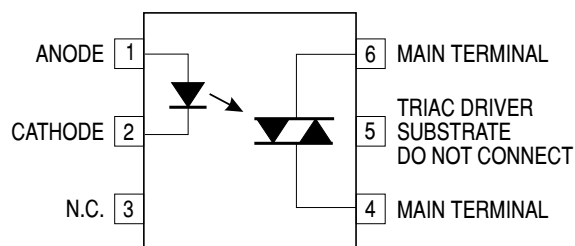
HPS1000 INTEGRATED CIRCUIT DIAGRAMS

U1, U3, U100, U101, U102

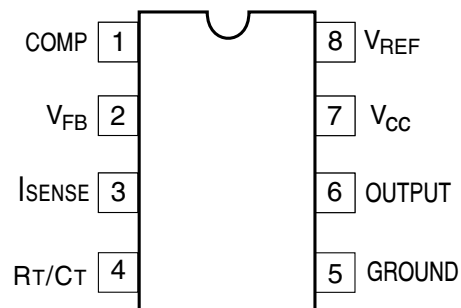
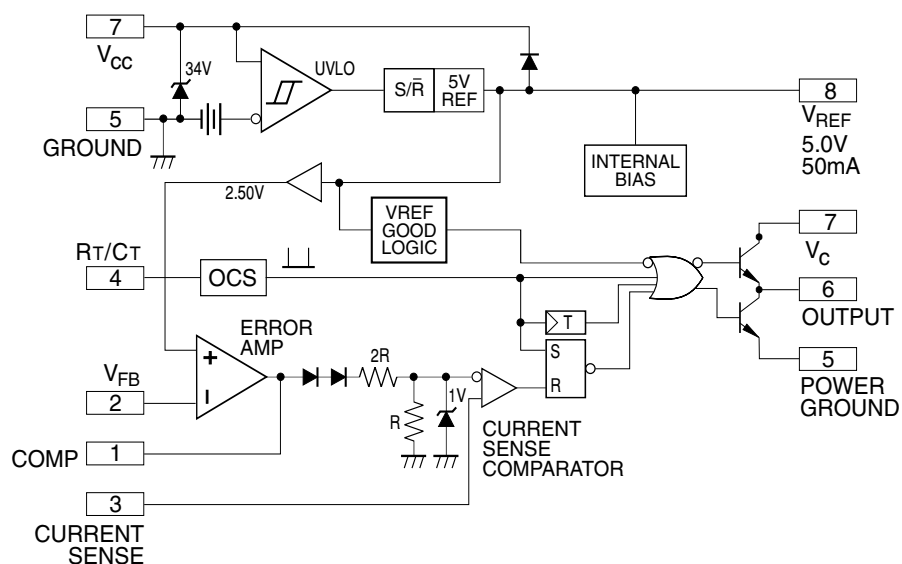
OP-AMP QUAD, (TL074, LM324)

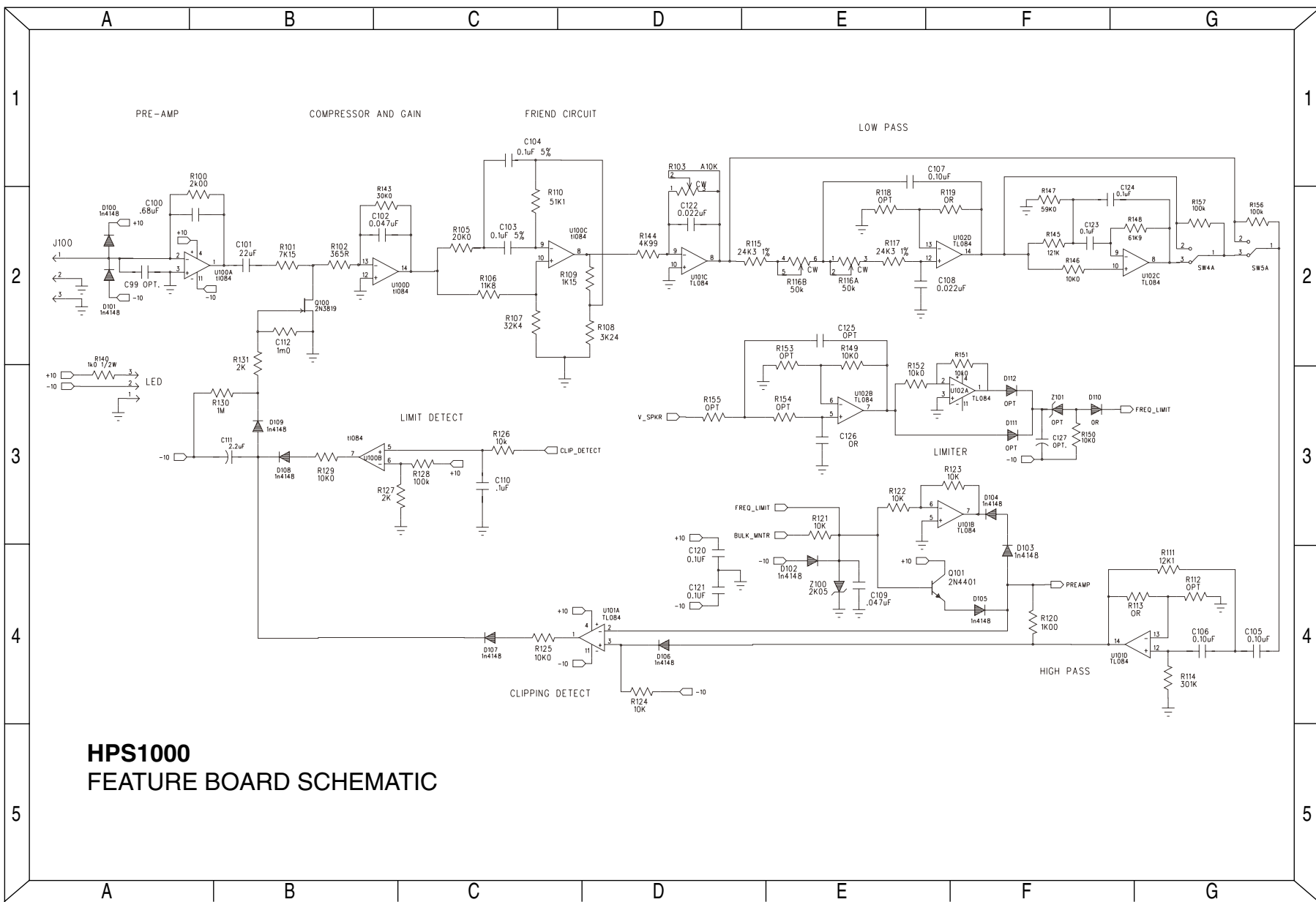


U4 - MOC3012 FOTO

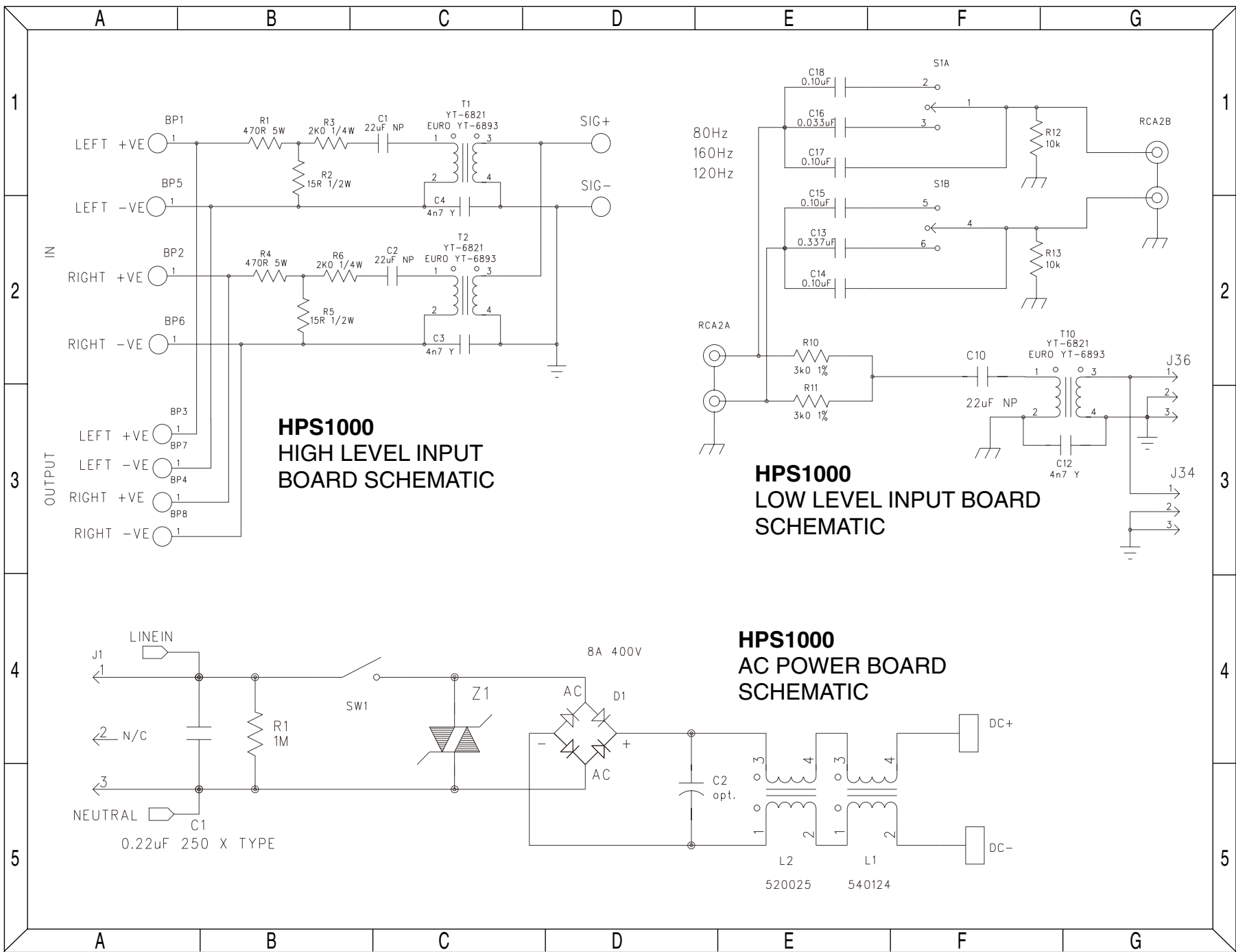


U5 - UC3842N PWM CONTROLLER



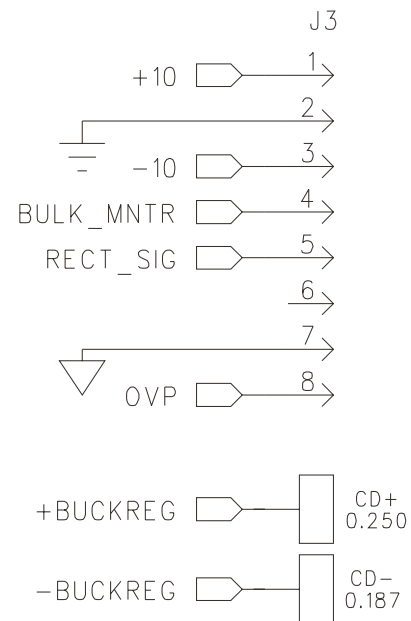
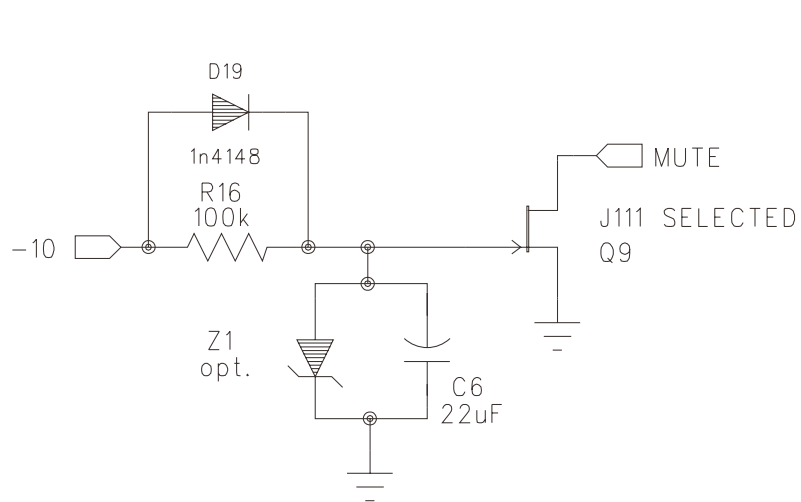
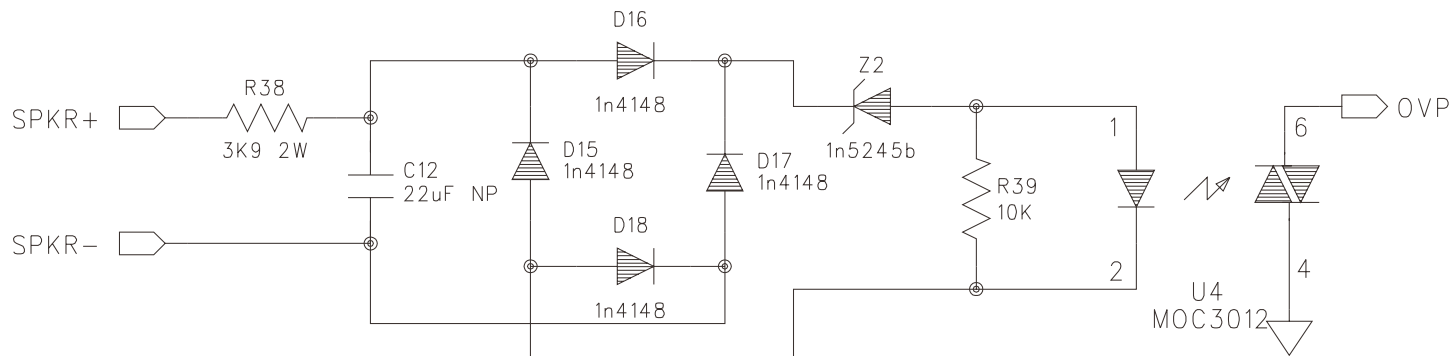


HPS1000
FEATURE BOARD SCHEMATIC



HPS1000





HPS1000
LINEAR AMPLIFIER SCHEMATIC
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